CLAIMS

What is claimed is:

1. An interferometer, comprising:
   a. A beam splitter;
   b. A first reflective element mounted relative to the beam splitter defining a first optical path from the beam splitter to the first reflective element and back to the beam splitter;
   c. A path-two OPD element, having a variable optical path length therethrough, mounted relative to the beam splitter defining a port optical path from a port of the interferometer through the OPD element to the beam splitter;
   d. A second reflective element mounted relative to the beam splitter defining a second optical path from the beam splitter to the second reflective element and back to the beam splitter, passing through the path-two OPD element at least once.
2. An interferometer as in Claim 1, wherein the beam splitter comprises an element having a thickness disposed in the first optical path, and wherein the path-two OPD element has a thickness disposed in the second optical path, and wherein the path-two OPD element is configurable to have an effective optical path length therethrough that is substantially the same as the effective optical path length through the beam splitter element.
3. An interferometer as in Claim 1, wherein the port comprises an input port of the interferometer.
4. An interferometer as in Claim 1, wherein the port comprises an output port of the interferometer.
5. An interferometer as in Claim 1, wherein the port comprises an input port of the interferometer and an output port of the interferometer.
6. An interferometer as in Claim 1, wherein the path-two OPD element comprises a refractive element mounted such that the second optical path encounters a thickness of the refractive element, and mounted such that the thickness is variable.
7. An interferometer as in Claim 1, wherein the path-two OPD element comprises a wedged refractive element, mounted such that the thickness of the wedged refractive element in the second optical path is variable.
8. An interferometer as in Claim 6, wherein the refractive element comprises first and second surfaces spaced apart and oriented non-parallel to the optical path, and wherein the refractive element is mounted such that the angle of the first and second faces to the optical path is variable.
9. An interferometer as in Claim 6, wherein the refractive element is mounted such that it can be rotated about an axis non-parallel to the optical path.

10. An interferometer as in Claim 9, wherein the refractive element is mounted such that rotation about the axis changes the thickness of the refractive element encountered by light traveling the optical path.

11. An interferometer as in Claim 6, wherein the refractive element comprises a refractive material having first and second surfaces spaced apart, and wherein the refractive element is mounted such that the first and second surfaces are oriented non-parallel to the optical path, and wherein the refractive element is mounted rotatably about a rotation axis non-parallel to the optical path such that such rotation changes the distance between the first and second surfaces encountered by light traveling the second optical path.

12. An interferometer as in Claim 11, wherein the rotation axis is substantially perpendicular to the optical path.

13. An interferometer as in Claim 1, wherein the beam splitter comprises a coated refractive element, having an effective optical path length therethrough, and wherein the path-two OPD element comprises a refractive element mounted such that the effective optical path length therethrough is variable over a range that includes the effective optical path length through the beam splitter.

14. An interferometer as in Claim 13, wherein the path-two OPD element is mounted rotably about a rotation axis substantially perpendicular to the optical path, and wherein the path-two OPD element comprises a rectangular cross-section in a plane parallel to the optical path and normal to the rotation axis.

15. An interferometer as in Claim 1, wherein the second reflective element comprises a second reflective surface, and wherein the first reflective element comprises a first reflective surface, and wherein, for light input to the interferometer at a selected input angle, light on the second optical path encounters the second reflective surface substantially normal thereto and light on the first optical path encounters the first reflective surface substantially normal thereto.

16. An interferometer as in Claim 1, further comprising a path-one OPD element, having a variable optical path length therethrough, mounted relative to the beam splitter and the first reflective element such that the first optical path passes through the path-one OPD element at least once.

17. An interferometer as in Claim 1, further comprising a path-one corrective element mounted such that the first optical path passes therethrough.

18. An interferometer as in Claim 1, further comprising a path-two corrective element mounted such the second optical path passes therethrough.

19. An interferometer as in Claim 1, further comprising:

   a. a path-one corrective element mounted such the first optical path passes therethrough; and

b. a path-two corrective element mounted such the second optical path passes therethrough.

20. A method of making an interferometer, comprising:

a. Mounting a beam splitter and a first reflective element in a fixed angular relationship to each other, defining a first optical path from the beam splitter to the first reflective element and back to the beam splitter;

b. Mounting a second reflective element in a fixed angular relationship to the beam splitter, defining a second optical path from the beam splitter to the second reflective element and back to the beam splitter;

c. Mounting a path-two OPD element relative to the beam splitter such that light from a port of the interferometer passes through the path-two OPD element before reaching the beam splitter and such that the second optical path encounters a variable optical path length through the path-two OPD element.

21. A method as in Claim 20, wherein mounting a path-two OPD element comprises mounting a refractive element rotatably about an axis non-parallel to the second optical path, wherein the optical path length through the refractive element along the second optical path varies with rotation of the refractive element about the axis.

22. A method as in Claim 20, further comprising:

a. Determining an angular error related to misalignment of the beam splitter, the first reflective element, and the second reflective element;

b. Mounting one or more corrective elements relative to the beam splitter, the first reflective element, and the second reflective element such that the misalignment is corrected.

23. A method of generating interferometric information, comprising:

a. Mounting a beam splitter and a first reflective element in a fixed angular relationship to each other, defining a first optical path from the beam splitter to the first reflective element and back to the beam splitter, and defining a first port along the path of light along the first optical path reflecting from the beam splitter;

b. Mounting a second reflective element in a fixed angular relationship to the beam splitter, defining a second optical path from the beam splitter to the second reflective element and back to the beam splitter, and defining a second port along the path of light along the second optical path reflecting from the beam splitter;

c. Mounting a path-two OPD element relative to the beam splitter such that light from the second port of the interferometer passes through the path-two OPD element before reaching the beam splitter and such that the second optical path encounters a variable optical path length through the path-two OPD element;

d. Supplying light to at least one of the first and second ports;

e. Determining interferometric information by detecting light at at least one of the first and second ports; and

f. Placing a sample either between a light source and at least one of the first and second ports or between a detector and at least one of the first and second ports.

24. An interferometer, comprising:

a. a beam splitter;

b. a first reflective element;

c. a second reflective element;

d. wherein the first and second reflective elements mount relative to the beam splitter and each other and define:

i. a first optical path from the beam splitter, to the first reflective element, to the second reflective element, back to the first reflective element, and back to the beam splitter;

ii. a second optical path from the beam splitter, to the second reflective element, to the first reflective element, back to the second reflective element, and back to the beam splitter;

e. an OPD element, mounted relative to the first and second reflective elements such that the first optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements and such that the second optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements.

25. An interferometer as in Claim 24, wherein the beam splitter has a thickness disposed in the second optical path, and further comprising a compensator disposed in the first optical path, wherein the effective optical path through the compensator is substantially the same length as the effective optical path through the beam splitter thickness.

26. An interferometer as in Claim 24, wherein the OPD element comprises a refractive element mounted such that the first optical path encounters a thickness of the refractive element, such that the second optical path encounters a thickness of the refractive element, and mounted such that the encountered thicknesses are variable.

27. An interferometer as in Claim 24, wherein the OPD element comprises a wedged refractive element, mounted such that the thickness of the wedged refractive element in the first and second optical paths is variable.

28. An interferometer as in Claim 26, wherein the refractive element comprises first and second surfaces spaced apart and oriented non-parallel to the optical path, and wherein the

refractive element is mounted such that the angle of the first and second faces to the optical path is variable.

29. An interferometer as in Claim 24, wherein the OPD element comprises a refractive element mounted rotatably with respect to an axis non-parallel to those parts of the first and second optical paths that pass through the refractive element.

30. An interferometer as in Claim 29, wherein the axis is substantially perpendicular to the portion of the first optical path that passes through the refractive element.

31. An interferometer as in Claim 29, wherein the refractive element is mounted such that rotation about the axis changes the thickness of the refractive element encountered by light traveling the first and second optical paths.

32. An interferometer as in Claim 26, wherein the refractive element comprises a refractive material having first and second surfaces spaced apart, and wherein the refractive element is mounted such that the first and second surfaces are oriented non-parallel to the optical path, and wherein the refractive element is mounted rotatably about a rotation axis non-parallel to the first and second optical paths such that such rotation changes the distance between the first and second surfaces encountered by light traveling the first and second optical paths.

33. An interferometer as in Claim 24, wherein the second reflective element comprises a second reflective surface, and wherein the first reflective element comprises a first reflective surface, and wherein, for light input to the interferometer at a selected input angle, light on the second optical path encounters the first reflective surface substantially normal thereto and light on the first optical path encounters the second reflective surface substantially normal thereto.

34. An interferometer as in Claim 24, further comprising a path-one corrective element mounted such the first optical path passes therethrough.

35. An interferometer as in Claim 24, further comprising a path-two corrective element mounted such the second optical path passes therethrough.

36. An interferometer as in Claim 24, further comprising:

   a. a path-one corrective element mounted such the first optical path passes therethrough; and

   b. a path-two corrective element mounted such the second optical path passes therethrough.

37. A method of making an interferometer, comprising:

   a. Mounting a beam splitter, a first reflective element, and a second reflective element in a fixed angular relationship to each other, defining:

      i. a first optical path from the beam splitter, to the first reflective element, to the second reflective element, back to the first reflective element, and back to the beam splitter;

ii. a second optical path from the beam splitter, to the second reflective element, for the first reflective element, back to the first reflective element, and back to the beam splitter;

b. mounting an OPD element relative to the beam splitter, the first reflective element, and the second reflective element such that the first optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements and such that the second optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements.

38. A method as in Claim 37, wherein mounting an OPD element comprises mounting a refractive element rotably about an axis non-parallel to the second optical path, wherein the optical path length through the refractive element along the second optical path varies with rotation of the refractive element about the axis.

39. A method as in Claim 37, further comprising:

a. Determining an angular error related to misalignment of the beam splitter, the first reflective element, and the second reflective element;

b. Mounting a corrective element relative to the beam splitter, the first reflective element, and the second reflective element such that the misalignment is corrected.

40. A method of generating interferometric information, comprising:

a. Mounting a beam splitter, a first reflective element, and a second reflective element in a fixed angular relationship to each other, defining:

i. a first optical path from the beam splitter, to the first reflective element, to the second reflective element, back to the first reflective element, and back to the beam splitter;

ii. a first port, along the path of light from the first optical path reflecting from the beam splitter;

iii. a second optical path from the beam splitter, to the second reflective element, for the first reflective element, back to the first reflective element, and back to the beam splitter;

iv. a second port, along the path of light from the second optical path reflecting from the beam splitter;

b. mounting an OPD element relative to the beam splitter, the first reflective element, and the second reflective element such that the first optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements and such that the second optical path passes through the OPD element along a path of variable optical length between the first and second reflective elements.

c. Supplying light to at least one of the first and second ports;

d. Determining interferometric information by detecting light at at least one of the first and second ports; and

e. Placing a sample between the light source and at least one of the first or second ports or between a detector and at least one of the first and second ports.

41. A method of generating interferometric information, comprising:

a. Sampling a reference channel from an interferometer;

b. Sampling an IR channel from an interferometer;

c. Generating interferometric information by interpolating the IR channel data based on a relationship between the optical path difference of the reference channel and the optical path difference of the IR channel.